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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/743,722	DUMITRAS ET AL.
	Examiner	Art Unit
	David N. Werner	2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-24,29 and 31-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-24,29 and 31-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20081222*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This Office action for U.S. Patent Application 10/743,722 is responsive to the Request for Continued Examination filed 22 December 2008, in reply to the Final Rejection of 21 August 2008. Currently, claims 1–8, 10–24, 29, and 31–33 are pending.

2. In the previous Office action, claims 1, 5, 10–13, 18–22, 29, and 32–33 were rejected under 35 U.S.C. 103(a) as obvious over "Temporally Adaptive Motion Interpolation Exploiting Temporal Masking in Visual Perception" (Lee et al.) in view of U.S. Patent Application Publication 2003/0142748 A1 (Tourapis et al.). Claims 2, 6–8, and 17 were rejected under 35 U.S.C. 103(a) as obvious over Lee et al. in view of Tourapis et al. and in view of "Scene-Context Dependent Reference Frame Placement for MPEG Video Coding" (Lan et al.). Claims 3, 4, 14, and 23 were rejected under 35 U.S.C. 103(a) as obvious over Lee et al. in view of Tourapis et al. and in view of U.S. Patent Application Publication 2002/0146071 A1 (Liu et al.). Claims 15 and 24 were rejected under 35 U.S.C. 103(a) as obvious over Lee et al. in view of Tourapis and in view of "MPEG Video Compression Standard" (Mitchell). Claims 16 was rejected under 35 U.S.C. 103(a) as obvious over Lee et al. in view of Tourapis et al. and "Digitale Bildcodierung" (Ohm). Claim 31 was rejected under 35 U.S.C. 103(a) as obvious over Lee et al. in view of Tourapis et al. and in view of "Video Indexing Using MPEG Motion Compensation Vectors" (Ardizzone et al.).

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 22 December 2008 has been entered.

Information Disclosure Statement

4. The information disclosure statement filed 22 December 2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. In particular, no copies of the cited foreign patent documents are enclosed.

Response to Arguments

5. Applicant's arguments filed with respect to claim 1 have been fully considered but they are not persuasive. Applicant makes two arguments: first, that Lee does not teach the claimed computation of motion vectors or determining a motion speed from computed motion vectors, and second, that neither of the prior art references cited disclose the claimed determination of a motion speed.

Regarding the statement that the motion compensation error determination of Lee is not necessarily from determination of motion vectors, Page 519: column 1 states that motion compensation error for a pixel is determined as a difference between an actual position of the pixel in a frame and a predicted position (equation 10), in which the predicted position is determined "by motion estimation", which is previously defined in page 516: column 2, third paragraph as a telescopic motion vector search method. Then, it is respectfully submitted that the motion compensation error calculation in Lee is derived from motion vectors. Furthermore, if there is no error in the motion estimation generated from the motion vector calculation, then the motion compensation error would be zero.

Regarding the statement that Tourapis et al. does not disclose determining a motion speed, Paragraph 0066 of Tourapis et al. states that if an object in a B frame is moving at constant speed, it is always possible to predict its current prediction without having to transmit any new motion vectors. As shown in figure 3, this direct mode B frame 302 is predicted from two reference P frames 300 and 304. Paragraph 0067 of Tourapis et al. states that it may be possible for "an entire frame" to be transmitted without motion vectors when "speed is in general constant on the entire frame". In this case, a plurality of B frames such as frames 404 and 406 may be directly scaled from the motion between reference frames 402 and 408, in proportion to their temporal distances. In this case, there is a constant motion over the entire frames from frame 402 to 408, exhibiting consistent motion speed, as claimed. The claimed motion speed

is the magnitude of the motion vector between the two reference frames, scaled for the direct mode B pictures.

It is known that speed is the magnitude of velocity, and is defined as the magnitude of a change in distance over time. If rectangular or Cartesian coordinates are used, then for a pixel or block of pixels traveling between two frames, then its speed is defined as: $\frac{\sqrt{dx^2 + dy^2}}{t}$, where dx and dy are the x and y coordinates of the motion vectors of the pixel or block and t is the inverse of the picture rate, or the temporal distance between pictures. (The formula for speed in claim 31 is similar, with the Euclidian distance metric replaced with the Manhattan distance metric). Then, it is respectfully submitted that if the motion vector and frame rate are known for a particular block in a frame, as shown in Tourapis et al., then the speed is also known.

Considering this, the prior art rejection of claim 1 is maintained.

6. Applicant's arguments with respect to claim 32 have been considered but are moot in view of the new ground(s) of rejection. Claim 32 has been amended to state that a motion speed consistency measure is determined from a blockwise mean absolute difference value, whereas in Lee et al., motion error is determined from a pixelwise sum of absolute difference value. However, it is respectfully submitted in the art that the Mean Absolute Difference (MAD) is a known measurement for the error between a predicted block and an actual block, as will be shown below.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-8, 10-24, 29, and 31-33 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Supreme Court precedent[1] and recent Federal Circuit decisions[2] indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. In the present case, the claims do not state what performs the claimed method steps. It is suggested that claim 1, for example, be amended to state that the method steps are performed by a specific apparatus or to state **within the steps** in the method claim that the method operates on **video** data. Since a "picture" of video data is commonly understood to contain many thousands, if not millions, of pixels, it is considered inherent that a method that decodes an entire "video" picture must be must be performed by a machine, and not mentally or manually.

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[1] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 US 780, 787-88 (1876).
[2] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 5, 10-13, 18-22, 29, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Temporally Adaptive Motion Interpolation Exploiting Temporal Masking in Visual Perception" (Lee et al.), in view of US Patent Application Publication 2003/0142748 A1 (Tourapis et al.). Lee et al. teaches a method for dynamically determining a Group of Picture (GOP) structure in a video based on temporal segmentation. **Regarding claim 1**, in one embodiment of Lee et al., temporal segmentation is determined from a motion compensation error determination based on a difference between an actual position of the pixels with a predicted position of the pixels, as determined from motion estimation (pg. 519: column 1). Since the motion estimation is calculated from a motion vector search (pg. 516: column 2), the motion compensation error is determined "based on the computed motion vectors" from the picture. Then, Lee et al. discloses "computing motion vectors for a plurality of pictures".

Consider the determination of temporal segmentation based on motion compensation error in Lee et al. If the error between an actual frame and a predicted frame becomes too great, then it is determined that there is little consistency between frames, but if there is a small error, then temporally adjacent frames are considered to exhibit consistency. This information is used in a detector that finds a scene

segmentation point, which is a point at which small changes in a single scene have accumulated past a certain threshold away from a reference frame. The frame immediately preceding the scene segmentation point becomes a P frame, and the frames in between the last reference frame and the scene segmentation point are encoded as B frames (pg. 515: columns 1-2). Then, Lee et al. teaches assigning pictures as B pictures based on a consistency measure. However, as discussed in the interview of November 15, determining motion compensation error *per se* is not considered the same as determining consistent motion speed.

Tourapis et al. teaches a video coder that encodes inter macroblocks using various modes. In one mode, a "Direct prediction mode", a current macroblock in a B picture may be calculated from previously-decoded motion information (paragraph 0067), if motion speed is constant (paragraph 0066). Then, the motion for the current picture is just re-used from the previous picture, instead of being re-coded and re-transmitted. When motion speed is determined to be constant, the motion for the current macroblock is directly taken from the corresponding macroblock in a reference frame (paragraph 0068), and the motion speed, that is, the magnitude of the motion vectors across the picture, are scaled from the reference frames (paragraph 0067). This determination is known as Motion Projection. Then, in Tourapis et al., a constant motion speed is known as a measure of consistency between pictures. As shown in figure 4, a plurality of pictures 404 and 406 may be encoded as direct-mode B frames between reference pictures 402 and 408, and picture 404 is the claimed "first picture in

the plurality of pictures" closest to reference picture 402 exhibiting the same consistent scaled motion speed.

Lee et al. discloses the claimed invention except for determining a picture mode from a calculation of consistent motion speed. Tourapis et al. teaches that it was known to determine motion compensation mode as a result of a motion projection calculation of constant motion. Therefore, it would have been obvious to one having ordinary skill in the art to determine a picture mode based on the validity of an assumption of constant motion, as taught by Tourapis et al., since Tourapis et al. states in paragraph 0118 that such a modification would enable a direct mode coding of blocks in B pictures, further exploiting temporal redundancy with a current picture and reference pictures.

Regarding claim 5, the method of Lee et al. could be adjusted to insert 1-3 default P frames in a GOP to avoid encoding delay (pg. 516, column 2 – pg. 517, column 1). For a 16-frame GOP, if 1 P-frame is inserted, for example, no more than 8 B-frames could be inserted consecutively. Even if no P-frames are inserted by default in a GOP, the number of consecutive B-frames is limited by the GOP size of 15 or 16 frames, since a GOP starts with an I-frame.

Regarding claims 10-13 and 33, in Lee et al., two kinds of segmentation are determined, corresponding with the claimed “termination condition”. The first type of termination is the determination of a P picture, reached when an accumulated error in pictures goes past a certain threshold. This corresponds with a failure in the motion projection of Tourapis et al., in which case it is determined that a Direct Mode coding is inappropriate. When the threshold is reached, the frame immediately preceding the

segmentation point becomes a P frame, and the frames in between the last reference frame and the scene segmentation point are encoded as B frames (pg. 515: columns 1-2). Another segmentation detector determines an abrupt scene change, and encodes an I frame at the start of a new scene and a P frame at the end of the previous scene (pg. 515, column 1).

Regarding claim 18, figure 1 of Lee et al. shows a Temporally Adaptive Motion Interpolation (TAMI) encoder. This encoder includes a buffer, a conventional MPEG encoder, a motion estimation unit, a scene segmentation point (SSP) detector, and a GOP Structure unit (pg. 514, column 2 – pg. 515, column 1). If this GOP Structure Unit performs the Motion Projection calculation of Tourapis et al., it corresponds with the claimed "colinearity detector". **Regarding claim 19**, the TAMI unit determines the positions of P and B pictures in a GOP (page 514, column 2). **Regarding claim 20**, as mentioned previously, motion projection may be determined from the colinearity of motion vectors. **Regarding claim 21**, the Abrupt Scene Change (ASC) detector determines a scene change in an encoded video. **Regarding claim 22**, as mentioned above, at a scene change, an old scene ends with a P-frame and a new scene starts with an I-frame.

Regarding claim 29, in Tourapis et al., figure 6 illustrates a direct mode P picture at time t+2, in which the motion vector (dx, dy) for the corresponding block A at time t+1 is extended for current block B. This corresponds with the claimed iterative method.

10. Claims 2, 6-8, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. in view of Tourapis et al., as applied to claims 1 and 10 above, in view of "Scene-Context Dependent Reference Frame Placement for MPEG Video Coding" (Lan et al.), cited in the Information Disclosure Statement filed 12 May 2004. **Claim 2** of the present application recites encoding the first frame with a variance in motion speed as a P-frame. However, in Lee et al., the first frame with a motion inconsistency above a certain threshold is encoded as an I-frame, and the frame immediately previous to this point is encoded as a P-frame (pg. 515, column 2).

Lan et al. teaches a picture-type assignment algorithm in which if the difference in accumulated motion between a current frame and a reference frame is above a certain value, the current frame is encoded as a P-frame, and becomes the next reference frame (pg. 481, column 2).

Lee et al., in combination with Tourapis et al., discloses the claimed invention except for encoding the first frame that does not follow a frame trend as a P-frame. Lan et al. teaches that it was known to encode a significantly changed frame as a P-frame. Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to encode reference frames as P-frames rather than I-frames as taught by Lan et al., since it was well-known in the art that P-frames require less bits to be encoded than I-frames.

Additionally, claims 6 and 17 recite coding some pictures as I pictures for a random-access policy. Lee et al. and Tourapis et al. do not teach this limitation. Lan et al. teaches an MPEG coding method in which frame type assignment is varied.

Regarding claims 6 and 17, Lan et al. discloses forcing I frames into a coded video sequence every 15 frames to facilitate random access (pg. 486, column 1). **Regarding claim 7**, in Lan et al., whenever an I-frame is encoded, the previous frame is encoded as a P-frame (pg. 481, column 1). **Regarding claim 8**, in Lee et al., P frames can be encoded as P1 frames which are regular MPEG P frames, or as P2 frames, which have the same bit allocation as MPEG B frames and are thus coarsely quantized (pg. 514, column 2).

Lee et al., in combination with Tourapis et al., discloses the claimed invention except for forcing I-frame encoding. Lan et al. teaches that it was known to encode I-frames at regular intervals. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the coding method of Lee et al. to insert periodic I frames as taught by Lan et al., since Lan et al. states in page 486, column 1 that such a modification would enable random search and pause features at playback time.

11. Claims 3, 4, 14, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. in view of Tourapis et al. as applied to claims 1, 12, and 21, in view of US Patent Application Publication 2002/0146071 A1 (Liu et al). Lee et al. teaches scene change detection, but always encodes the first picture after the scene change as an I-frame and the last picture before the scene change as a P-frame.

Liu et al. teaches a scene change detection component in a video encoder. In Liu et al., a scene change is normally encoded as an I-frame. However, this is not

always the most efficient coding method. **Regarding claims 3, 14, and 23,** Figure 10 shows a scene change between frame 1001 and frame 1002. Frame 1001 was originally scheduled to be encoded as an I-frame, but since a scene change immediately follows, much computational effort would be wasted in calculating high-quality images immediately after the scene change. Then, frame 1001 is instead encoded as a P-frame, and frames 1002 and 1048 are encoded as low-quality predictive frames, since human vision is insensitive to quality changes near a scene change (paragraph [0079]), corresponding with the claimed coding of a picture before a scene change at full quality or low quality in **claim 4**. Figure 11 gives a further example. Here, a scene change occurs immediately preceding a P-frame 1102. Frame 1104, two frames before the scene change, was originally scheduled as an I-frame, but instead the I-frame is delayed until frame 1110, for which motion vectors have not yet been calculated (paragraph [0080]). Finally, figure 13 shows a scene change immediately preceding P-frame 1302, which was originally scheduled as an I-frame. However, since motion vectors 1304 and 1306 to frame 1302 have already been calculated, the I-frame is delayed until frame 1308, originally scheduled to be the next P-frame (paragraph [0082]).

Lee et al., in combination with Tourapis et al., teaches the claimed invention except for encoding P-frames immediately surrounding scene changes. Liu et al. teaches that it was known to encode a frame immediately preceding or immediately following a scene change as a P-frame. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to encode frames

adjacent to scene changes as P-frames as taught by Liu et al., since Liu et al. states in paragraph [0079] that such a modification would increase encoding efficiency by not encoding irrelevant data near a scene change, at which time the human eye cannot clearly distinguish details of an image.

12. Claims 15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al., in view of Tourapis et al., as applied to claims 10 and 21 above, and in further view of “MPEG Video Compression Standard” (Mitchell), cited in the Information Disclosure Statement of 17 July 2006. Although in Lee et al., a default picture is encoded as a B-frame, Lee et al. does not explicitly state that pictures adjacent to scene changes are B-frames. However, Mitchell states that since the eye is insensitive to image content near scene changes, image quality can be sacrificed. **Regarding claims 15 and 24,** one method of reducing image quality is to start a new scene with B pictures (footnote 13).

Lee et al., in combination with Tourapis et al., discloses the claimed invention except for encoding B-frames adjacent to a scene change. Mitchell teaches that it was known to encode B-frames immediately following a scene change. Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to force B-frames immediately following a scene change, as taught by Mitchell, since Mitchell states in page 79 that such a modification would reduce the bit rate needed to encode a scene change.

13. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. in view of Tourapis et al. as applied to claim 12 above, and in further view of "Digitale Bildcodierung" (Ohm), cited in the Information Disclosure Statement of 17 July 2006. Lee et al. teaches scene change detection based on a low correlation between two images (pg. 515, column 1), but does not disclose the exact method used. Ohm teaches the Normalized Cross-Correlation Function (NCCF), shown as equation 5.52. **Regarding claim 16,** NCCF is used in many pattern-matching applications, such as motion estimation (pg. 1). Two images, $x_a(m_a, n_a)$, and $y_j(m_a, n_a)$, are compared over pixels (m_a, n_a) in area Λ. This corresponds with images $x_n(i, j)$ and $x_{n+1}(i, j)$ in area (M, N) in the present invention. Two pictures have the highest match when the NCCF is at a maximum (pg. 3), and correspondingly, two pictures have a low match, indicative of a scene change, when the value of NCCF is low.

Lee et al., in combination with Tourapis et al., discloses the claimed invention except for the exact method used to determine correlation of two images. Ohm teaches that it was known to determine how closely two images match each other with Normalized Cross-Correlation. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the correlation of two images using NCCF, as taught by Ohm, since Ohm states in page 4 that such a modification would allow for a more accurate comparison of the similarity of two images rather than by difference levels alone.

14. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. in view of Tourapis et al., as applied to claim 29 above, and in further view of "Video Indexing Using MPEG Motion Compensation Vectors" (Ardizzone et al.) Conventionally, a motion vector for a block is defined as the displacement of the block between two pictures, velocity is defined as displacement over time, and speed is defined as the magnitude of velocity. However, while two-dimensional displacement is normally given with the Euclidian distance metric, the square root of the sum of the squares of the x and y components, in claim 31, displacement is given with the Manhattan distance metric, the sum of the x and y components. Ardizzone et al. teaches a method for spatially segmenting an MPEG image with motion vectors (pg. 725, columns 1-2). In one step of Ardizzone et al., magnitudes of the motion vectors are built into a histogram to determine "dominant" regions of the image (pg. 727, column 2). If a motion vector has a large magnitude, this means that its macroblock is displaced a large distance, and so has a high speed. An experiment was performed to determine how best to retrieve related images to a given image, by matching motion vector characteristics (pg. 728, column 2 – pg. 729, column 1). **Regarding claim 31,** using a Manhattan distance metric yielded the best result (pg. 729, column 1).

Lee et al. discloses the claimed invention except for defining pixel block displacement with a Manhattan distance metric. Ardizzone et al. teaches that it was known to calculate motion vector magnitude with Manhattan distance. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine motion speed of an image based on the Manhattan distance

metric, as taught by Ardizzone et al., since Ardizzone et al. states in page 729, column 1, that such a modification would produce the greatest accuracy in characterizing the motion vectors of the image.

15. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. in view of Tourapis et al. as applied to claim 29 above, and further in view of U.S. Patent Application Publication 2002/0012452 A1 (van Overveld et al.). Claim 32 is directed to calculating the MAD value of blocks over a frame to determine motion speed consistency. In contrast, Lee et al. teaches calculating an SAD value.

Van Overveld et al. teaches a motion compensation system. Regarding claim 32, van Overveld et al. lists several common algorithms to determine a motion estimation error between a motion-compensated macroblock and an actual macroblock. These algorithms include the Mean Square Error (paragraph 0049), the SAD (paragraph 0051), the MAD (paragraph 0053), and the Sum of Square Errors (paragraph 0053).

Lee et al., in combination with Tourapis et al., discloses the claimed invention except for calculating an MAD as a motion vector error. Van Overveld et al. teaches that it was known to use a MAD instead of an SAD to determine motion estimation accuracy. Therefore, it would have been an obvious matter of design choice to determine motion error with the MAD rather than the SAD, since applicant has not disclosed in the specification, particularly paragraph [50], that the exact method of error

calculation solves any stated problem or is for any particular purpose, and it appears that the invention would perform equally well with either error metric.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621